UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

3D SYSTEMS, INC.,)) Plaintiff,)) v.)) **ENVISIONTEC, INC., ENVISIONTEC GMBH**,) and **SIBCO, INC.,**)) Defendants.))	Case No. 2:05-cv-74891 Hon. Avern Cohn Magistrate Judge Hon. R. Steven Whalen

DEFENDANTS' MEMORANDUM IN OPPOSITION TO 3D SYSTEMS' MOTION FOR
SUMMARY JUDGMENT OF INFRINGEMENT OF U.S. PATENT NOS.
5,630,981; 5,651,934; 5,902,537; AND 4,999,143

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I.   Introduction

Defendants submit this Memorandum in Opposition to 3D Systems' Motion for

Summary Judgment of Infringement. As will be explained herein and as set forth in Defendants'

Motion for Summary Judgment of Non-Infringement, it is Defendants who are entitled to

summary judgment of non-infringement as to each of the patent claims presently at issue.

II.   Overview Of The Patents In Suit

The following claims are at issue in the parties' motions for summary judgment:

- '981 Patent, Claim 11 (basic stereolithography)

- '143 Patent, Claim 35 (removable supports)

- '537 Patent, Claim 81 (vacuum assisted recoating)

- '934 Patent, Claim 2   (smoothing element)

The paradigm patents are directed to stereolithography, a method of making solid objects

from a computer model. One key aspect of the process involves generating adjacent cross

sectional data for the object so that the object is built as a series of sequentially solidified slices

or layers. The '981 Patent describes this aspect of the process as follows:

> The aforedescribed technique is more specifically outlined in the flowchart of
> FIG. 2, wherein Step 12 calls for containing a fluid medium capable of
> solidification in response to prescribed reactive stimulation. Step 13 calls for
> application of that stimulation as a graphic pattern at a designated fluid surface **to
> form thin, solid, individual layers at that surface, each layer representing an
> adjacent cross-section of a three-dimensional object to be produced**.

('981 Patent at 5:29-36).

The objects being built in the claimed process are typically built on a build platform that

moves during the build process. The '143 Patent, in particular, is directed to "removable

supports" which support the part on the platform. The supports are solid, and the patent and its

file history[1] describe them as "web supports":

"In accordance with the invention, supports are provided in the form of 'WEBS'. Webs, in cross-section are *long slender rectangular structures*." The '143 Patent at 6:52-54 (emphasis added).
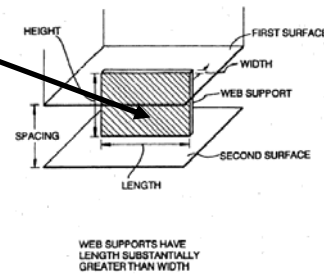
The '537 Patent is directed to a variation of stereolithography that involves the use of a

vacuum assisted recoater. The recoater is swept across the surface of the curable liquid by a

motor-driven threaded drive shaft[2] to level the liquid between periods of drawing the light on the

resin. The motor-driven threaded drive shaft is depicted below:
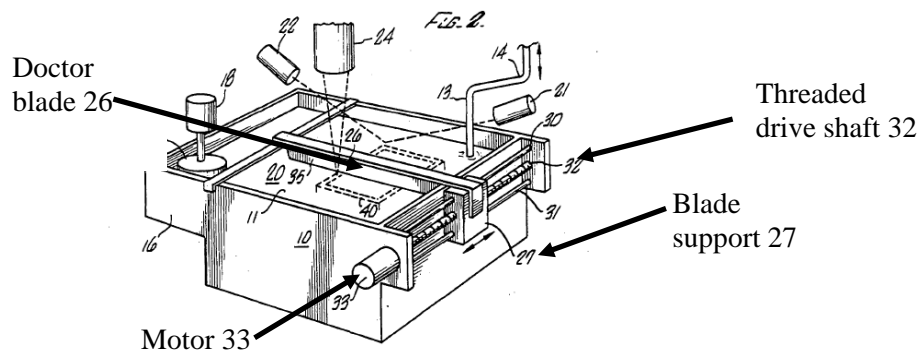
The '934 Patent is directed to a winged "smoothing member" that is also swept across the

surface of the curable liquid to level it and which is depicted as follows:

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[1] Response after Final Rejection, dated August 21, 1990 at 17 (Defendants' Exh. 11 to their Summary Judgment Motion).
[2] U.S. Patent No. 5,174,931 (Defendants' Exh. 14 to their Motion for Summary Judgment) at FIG. 2, which is incorporated by reference in the '537 Patent at 3:9-33.

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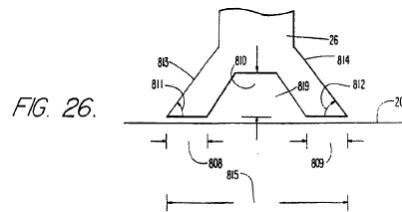
FIG. 26.

The '934 Patent at FIG. 26.

As indicated above, stereolithography involves the solidification of a curable material to sequentially form object slices and build an object on a step-wise or layer by layer manner. The paradigm patents describe the manner in which radiation or "synergistic stimulation" is applied as "drawing":

> [W]hile a variety of stereolithographic systems have been disclosed for the practice of the present invention, they all have in common the concept of drawing upon a substantially two-dimensional surface and extracting a three-dimensional object from that surface.

The '981 Patent at 12:9-14.

3D Systems describes FIG. 3 of the '981 patent as showing a light source 26 which "produces a spot 27 which traverses the surface 23 to cure a layer of the liquid 22. The light source 26 is arranged so it can be programmed to be turned off and on and to move such that the focus spot 27 moves across the surface 23 of the liquid 22". 3D Systems also refers to FIG. 5 of the '981 patent as disclosing a collimated UV light source 35 and suitable apertured mask. The accused Perfactory and Vanquish machines, however, do not use a spot light to cure the resin; do not use collimated UV light sources; do not use any physical apertured mask; do not use an on/off light source; and do not move a solid layer that was formed below the liquid surface, stop the elevator platform, and flow new liquid across the surface. (Jacobs 12/19/08 Decl. at ¶¶ 9-12).

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III.   3D Systems Incorrectly Describes The Accused Perfactory And Vanquish Machines In Its Memorandum

To describe the basic components of the Perfactory machine, 3D Systems refers to its Exhibit 6. This document, however, only relates to a presentation to a European company, Widex. As set forth in Mr. Siblani's December 18, 2008 Declaration at paragraphs 22-27, European and Asian customers or potential customers cannot produce a high quality STL file and the customers in Europe and Asia provide their own sliced data which already has a preset uniform thickness for each slice. Further, the Perfactory Software Suite (PSS) software for Europe and Asia includes a special build filter that reads the sliced data received from the customer. For the Perfactory and Vanquish machines that have been sold in the United States, there is no build filter; the PSS software cannot read sliced data files; and the PSS software used in the United States can only read high quality STL files. (Magda Decl. at ¶ 7). Thus, 3D Systems' Exhibit 6 does not show a model at the build platform that is made by an accused Perfactory machine in the United States.

At page 3 of its Memorandum, 3D Systems refers to its Exhibit 7 as an example of the Vanquish machine. This document states that the Vanquish machine provides "continuous layerless Z build" and "eliminates the part layering that is visible in other competing layer based Rapid Prototyping technologies [e.g., 3D Systems]". (Siblani 12/18/08 Decl. at ¶ 28).

3D Systems also incorrectly describes the operation of the DLP mirrors as either being on or off (3D Systems' Memorandum at p. 3). The exhibit that 3D Systems relies upon, Exhibit 8, states that the digital mirrors tilt to the on or off position or they pulsate at different frequencies to provide a grayscale value from 0 to 255 based on the bitmap data; the use of "gray scaling" causes different locations across the liquid to polymerize/cure to different depths; and "instead of

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slicing part model data into cross-sections, the part is progressively built from bitmap data".
(Siblani 12/18/08 Decl. at ¶ 31).

3D Systems incorrectly characterizes the processing software for the accused Perfactory
and Vanquish machines at pages 3-5 of its Memorandum. 3D Systems refers to its Exhibits 12-
29 to mischaracterize the data processing software as providing for "slicing" of a model into
"layers". 3D Systems has mischaracterized the operation of the data processing software for the
accused Perfactory and Vanquish machines even though it knew, when it filed its motion for
summary judgment, that the exhibits upon which it relies are irrelevant to the issue of whether
the accused Perfactory and Vanquish machines that are sold in the United States infringe any one
of the patent claims at issue.

As set forth in the December 18, 2008 Declaration of Mr. Siblani, the exhibits upon
which 3D Systems relies in its motion for summary judgment came from Envisiontec GmbH in
Germany. 3D Systems was advised that these documents were almost exclusively related to
machines that were only offered for sale or sold in Europe and Asia. As set forth previously, the
customers or potential customers in Europe and Asia provide their own sliced data which already
has a preset uniform thickness for each slice. The Perfactory Software Suite (PSS) for Europe
and Asia includes a build filter that reads the sliced data received from the customer. Since the
sliced data received from the customers in Europe and Asia is two-dimensional data, it is not
possible to perform the three-dimensional voxelization process, which is used in the machines
sold in the United States. In Europe and Asia, the customers cannot produce a high quality STL
file, and therefore, a specific build filter must be incorporated into the PSS in Europe and Asia to
read the 2D sliced data received from the customers. Further, the PSS cannot modify the sliced

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data which is the reason why there must be a build filter. However, for the accused Perfactory

and Vanquish machines that have been sold in the United States, there is no build filter; the PSS

software cannot read sliced data files, e.g., SLC or CLI files; and the PSS software used in the

United States can only read high quality STL files. (e.g., Siblani 12/18/08 Decl. at ¶¶ 22-27, 35,

and 38; Magda Decl. at ¶ 7).

The exhibits that 3D Systems refers to with respect to describing the data processing

software are irrelevant for the reasons set forth in Mr. Siblani's December 18, 2008 Declaration

at paragraphs 35 and 38. For example, 3D Systems Exhibit 18 only relates to a Perfactory

machine that was sold in Europe and Asia and never sold in the United States. 3D Systems'

Exhibit 24 includes copies of screen shots prepared by 3D Systems' counsel. As clearly shown

therein, if a customer attempts to read a SLC or CLI file, an error message will appear which

says: "No plugin available which can read/write it!". 3D Systems' Exhibit 34 is a document that

only relates to a potential sale of a Vanquish machine to Ford in the United Kingdom and has no

relevance to the issue of infringement for Perfactory or Vanquish machines that have been sold

in the United States. (Also see Magda Decl. at ¶¶ 3-7).

On page 5 of 3D Systems' Memorandum, it mischaracterizes the operation of the accused

Vanquish machine. The animation referred to by 3D Systems only represents frozen moments in

time which never occur. Further, the frozen moments in time do not even represent curing of the

resin. Instead, the wedge shapes are illustrative of the heat that is generated from the exothermic

reaction. Moreover, a frozen moment in time such as shown on page 5 of 3D Systems'

Memorandum can never occur in the Vanquish machine because the platform is continuously

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moving downward and the DLP projector light is always on. (e.g., Siblani 12/18/08 Decl. at ¶¶ 17, 51, and 58; Shkolnik Decl., ¶ 9; Jacobs 12/19/08 Decl. at ¶ 22).

A correct description of the operation of the accused Perfactory and Vanquish machines that are sold in the United States is set forth in the December 18, 2008 Declaration of Mr. Siblani, the Declaration of Dr. Schillen, and the Declaration of Dr. Magda. As set forth therein, the first step is to create a build volume based upon a computer aided design ("CAD") model. The build volume or build envelope is three-dimensional unlike the two-dimensional object slices that are disclosed in the patents at issue. The build volume is then subdivided into a large number of volume elements which are called voxels. The next step is to determine the intersection between each voxel volume and the three-dimensional part to be manufactured. Depending on the intersection amount, if any, a brightness intensity value is assigned to each voxel volume which is unique for each voxel and independent of any other voxel. The individual voxel volume interference is expressed in a range of grayscale values between 0 and 255. The brightness intensity values or grayscale values are then used to generate a 3D volumetric model of the part to be manufactured before the part is actually built. Since each voxel, which has unique x, y, and z coordinates, is three-dimensional rather than two-dimensional, the build volume can be printed along any arbitrary axis. (Siblani 12/18/08 Decl. at ¶ 8-21 and 28; Magda Decl. at ¶¶ 3-7; Schillen Decl. at ¶¶ 6-18).

Each voxel uniquely corresponds to one of the mirrors in the DLP projector and dictates the intensity of the light projected from that mirror to the resin. The exposure of the light on the resin for each data point is based upon the grayscale values that is assigned to each voxel. The time of exposure is different for each individual data point or voxel. While the individual

mirrors on the DLP projector are activated depending on the grayscale value assigned to the

corresponding voxel, the time of data delivery is different for each mirror because each mirror

must be addressed with an individual grayscale value and the addressing of the individual data

point representations does not take place simultaneously. (e.g., Magda Decl. at ¶¶ 3-7; Siblani

12/18/08 Decl. at ¶¶ 8-21 and 28).

      If the individual mirror has a grayscale value of 255, it is on. If the individual mirror

receives a grayscale value of 0, it is off. If the grayscale value is between 0 and 255, the

individual mirror vibrates. For a grayscale value of 128, the individual mirror vibrates such that

fifty percent of the time it is in the on position and fifty percent of the time it is in the off

position. Further, since the three-dimensional information for the brightness intensity values is

provided individually for each voxel volume, the software makes it possible to increase the depth

of curing for any individual voxel beyond the maximum voxel depth by assigning a grayscale

value of 255 to one or more voxel volumes and then increasing the exposure time for specific

voxel volumes to increase the depth of cure beyond a maximum voxel depth. It is also possible

to have two voxels assigned the same grayscale value, but it is not possible to have the same

grayscale values for every voxel on the surface of the DLP chip. That is, it is not possible to

have a uniform brightness distribution of the light that is being projected onto the surface of the

DLP chip. The software modifies the voxels depending on geometry to reduce the internal

stresses caused by material shrinkage when the material for each voxel is solidified. Moreover,

the depth of cure is not only controlled on a voxel-by-voxel basis by the grayscale value of each

voxel but it is also controlled by applying multiple exposures. Multiple exposures on a voxel-by-

voxel basis is used to compensate in areas where the energy provided to that area by single

exposure is not sufficient to generate the solidification that is necessary for that area. (Magda Decl. at ¶¶ 3-7; Siblani 12/18/08 Decl. at ¶¶ 8-21 and 28).

The software for the accused Perfactory and Vanquish machines does not provide data representing adjacent cross-sectional layers of a three-dimensional object to be formed which was generated on a CAD system. Instead, the software requires: providing a three-dimensional build volume; subdividing the build volume into volume elements (voxels); determining whether there is an intersection between each voxel and the three-dimensional part to be manufactured; assigning a brightness intensity value to each voxel depending on the intersection amount, if any, which is unique for each voxel and independent of any other voxel; and using the three-dimensional set of brightness intensity values or grayscale values to generate a 3D volumetric model for the part to be manufactured before any manufacturing takes place. The ability to print along any arbitrary axis of the build volume; the modification of the voxels depending on geometry to reduce internal stresses; and the application of multiple exposures to compensate for areas requiring additional energy, is clear evidence that the software for the accused Perfactory and Vanquish machines that are offered for sale or sold in the United States, does not provide data representing adjacent cross-sectional layers of a three-dimensional object to be formed which was generated on a CAD system. (Magda Decl. at ¶¶ 3-7; Siblani 12/18/08 Decl. at ¶¶ 8-21 and 28; Schillen Decl. at ¶¶ 6-18; Shkolnik Decl. at ¶¶ 10-15; Jacobs 7/16/08 Decl. at ¶¶ 14, 20, and 27; Jacobs 12/19/08 Decl. at ¶¶ 5-8, 15, and 18-21).

IV.   The '981 Patent, Claim 11

At the outset, 3D Systems incorrectly states that the infringement of limitations 1-4 of claim 11 have been acknowledged by Defendants' interrogatory responses. Defendants do not

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agree, for example, with certain of the Court's claim construction rulings, and therefore, Defendants do not waive their right to claim that certain terms from limitations 1-4 of the '981 patent are not found in the accused Perfactory and Vanquish machines.

A.   '981 Patent Claim 11, Limitations 6, 8-11, And 13 – "Layers"

The following analysis also applies to limitations 2-4, 6, 8, and 11 of the '934 patent and limitations 2, 7, and 8 of the '537 patent.

3D Systems alleges at pages 6-8 of its Memorandum that the Perfactory and Vanquish machines form cross-sectional layers, slice CAD data, and form parts layer by layer. 3D Systems refers to Exhibits 8, 13, 14, 15, 17, 18, 32, 33, 36, 37, 43, 46, 48, 51, and 54 to argue that there are "hundreds of references to 'slices,' 'slicing,' 'layers,' and 'layering'" in these materials. However, for the following reasons, 3D Systems has failed to prove that the accused Perfactory and Vanquish machines form cross-sectional layers, or slice CAD data, or form parts layer by layer.

As set forth in the December 18, 2008 Declaration of Mr. Siblani at paragraphs 22-27, 3D Systems requested discovery documents from Envisiontec GmbH (a German company and one of the defendants in this case) on February 14, 2008. Even though the Defendants objected, they followed the recommendation of the Court and provided a substantial amount of discovery documents from Envisiontec GmbH on a voluntary basis. Defendants also voluntarily produced Dr. Schillen for deposition in the United States even though he is a German citizen. Counsel for 3D Systems were advised at the discovery depositions that the documents which were produced from Envisiontec GmbH almost exclusively related to machines that were only offered for sale or sold in Europe and Asia. Nevertheless, 3D Systems now refers to these irrelevant documents

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in its motion for summary judgment of infringement. While the documents that 3D Systems

refers to mention the words "slice" or "layers", the use of those words in Europe and Asia

resulted because those terms had been established in the industry by 3D Systems and other

companies prior to 2000. Further, the customers in Europe and Asia have always provided their

own sliced data which already has a preset uniform thickness for each slice. The Perfactory

Software Suite for Europe and Asia includes a build filter that reads the sliced data received from

the customer. However, since the sliced data received from the customers in Europe and Asia is

two-dimensional data, it is not possible to perform the three-dimensional voxelization process

which is used in the machines sold in the United States. In Europe and Asia, the customers

cannot produce a high quality STL file, and therefore, a specific build filter must be incorporated

into the Perfactory Software Suite in Europe and Asia to read the two-dimensional sliced data

received from the customers. Moreover, the Perfactory Software Suite cannot modify the sliced

data which is the reason why there must be a build filter. However, for the accused Perfactory

and Vanquish machines that have been sold in the United States, there is no build filter; the PSS

software cannot read sliced data files, e.g., SLC or CLI files; and the PSS software used in the

United States can only read high quality STL files. (e.g., Magda Decl. at ¶ 7; Siblani 12/18/08

Decl. at ¶¶ 22-27).

3D Systems refers to its Exhibit 8 which is a document that was prepared by Defendants'

attorneys before any discovery took place in this case. It is a tutorial which was only intended to

provide the Court with an overview of the Perfactory machine and the Perfactory process. This

tutorial erroneously included certain statements about the Perfactory machine that is only sold in

Europe or Asia because Mr. Siblani did not understand at the time that the Europe/Asia machines

are irrelevant to this lawsuit. Further, Mr. Siblani had not provided his attorneys with the distinguishing information between the machines sold in Europe/Asia and the machines sold in the United States. Nevertheless, page 9 of Exhibit 8 specifically states that a digital representation of a "build envelope" is sent to the mirror array; the digital mirrors tilt to the "on" or "off" position, or they pulsate at different frequencies to provide a grayscale value from 0-255 based on the "gray scaling"; and "instead of slicing part model data into cross-sections, the part is progressively built from bitmap data". (Siblani 12/18/08 Decl. at ¶¶ 29-32). Thus, 3D Systems' Exhibit 8 does not prove that the software used in the accused Perfactory and Vanquish machines form cross-sectional layers or slice data or form parts layer by layer.

Similarly, Exhibit 13 is a manual for machines only sold in Europe or Asia where a two-dimensional slice file is received from the customers in either Europe or Asia having a preset uniform slice thickness, and a build filter is included in the software for reading the two-dimensional data. However, in the United States, if a customer initiates "File Open", it will only open an error window because the Perfactory Software Suite used in the machines in the United States only operates in response to STL files and cannot operate in response to two-dimensional slice files. (Siblani 12/18/08 Decl. at ¶ 35(b)).

3D Systems' Exhibit 14 is also a manual that only applies to machines that have been sold in either Europe or Asia (Siblani 12/18/08 Decl. at ¶ 35(c)); Exhibit 15 is a manual that only relates to machines sold in either Europe or Asia (Siblani 12/18/08 Decl. at ¶ 35(d)); Exhibit 17 is a manual that only relates to machines that have been sold in either Europe or Asia (Siblani 12/18/08 Decl. at ¶ 35(f)); Exhibit 18 is a manual that only relates to machines that have been sold in either Europe or Asia (Siblani 12/18/08 Decl. at ¶ 35(g)); Exhibit 32 is a presentation for

a company located in <u>India</u> (Siblani 12/18/08 Decl. at ¶ 38(a)-(b)); Exhibit 33 are instructions

for a potential customer at Ford in the United Kingdom (Siblani 12/18/08 Decl. at ¶ 38(c));

Exhibit 36 is yet another document that was only presented to Ford in the United Kingdom

(Siblani 12/18/08 Decl. at ¶ 38(f)); Exhibit 37 is a document that relates to a product that was

never sold to anyone (Siblani 12/18/08 Decl. at ¶ 38(g)); Exhibit 43 is the original website of

Envision Technologies GmbH which was eliminated within sixty days of the purchase of

Envision Technologies GmbH (Siblani 12/18/08 Decl. at ¶ 38(l)); Exhibit 46 is a document that

has never been used in the United States and only relates to presentations in Europe or Asia

(Siblani 12/18/08 Decl. at ¶ 38(o)); Exhibit 48 was prepared by Hendrik John for Envision

Technologies GmbH before Envision Technologies GmbH was acquired in 2002 and has no

relevance to the accused Perfactory and Vanquish machines sold in the United States (Siblani

12/18/08 Decl. at ¶ 52(c)); Exhibit 51 is not relevant because it is a patent document that

discloses the use of electromagnetic irradiation with a mask having a fixed arrangement of two-

dimensional pixels (Siblani 12/18/08 Decl. at ¶ 52(i)); and Exhibit 54 is irrelevant because it was

prepared by Envision Technologies GmbH and only relates to offers for sale of machines in

either Europe or Asia before Envision Technologies GmbH was purchased (Siblani 12/18/08

Decl. at ¶ 52(f)).

For the foregoing reasons, none of the documents relied upon by 3D Systems describe the

operation of the accused Perfactory and Vanquish machines that have been sold in the United

States and none of the exhibits establish infringement with respect to limitations 6, 8-11, and 13

of claim 11.

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B.   **'981 Patent Claim 11 Limitations 5 and 12 – Data Representing Adjacent Cross-Sectional Layers**

The following also applies to limitations 4, 12, and 13 of the '537 patent and limitations 3 and 8 of the '143 patent.

At pages 9-11 of 3D Systems' Memorandum, it incorrectly refers to the animations for the Perfactory and Vanquish machines as alleged evidence that the Perfactory and Vanquish machines build on a layer-by-layer basis. However, the animations are strictly for the purpose of representing frozen moments in time. There is no support, scientific or otherwise, for 3D Systems' allegations that the Perfactory and Vanquish machines build on a layer-by-layer basis. 3D Systems did not analyze the software for the accused machines that are sold in the United States and its sole support for its infringement arguments comes from selected snapshots of animations that only represent frozen moments in time which never occur. (e.g., Siblani 12/18/08 Decl. at ¶ 17).

3D Systems' unsupported allegations are also inconsistent with the prior admissions by 3D Systems that "voxels" are not the same as slice layers. In a prior lawsuit involving several 3D Systems patents including the '143 and '537 patents, 3D Systems argued that the patent to Pomerantz (U.S. Patent No. 4,961,154) "describes a system in which objects are represented by 'voxels' (a voxel is the three-dimensional equivalent of a television pixel), <u>rather than the surface data [two-dimensional] used and claimed in the 3D patent</u>." (emphasis added). (Siblani 12/18/08 Decl. at ¶ 18).

Similarly, in the file history for 3D Systems' '662 patent (one of the patents in suit but not a paradigm patent), 3D Systems distinguished <u>voxelization</u> from its patents as follows:

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> Applicant also wishes to bring European Patent Application 87304865.6 [3D Systems' Ex. 81], applied for by Scitex Corporation Ltd., and published December 23, 1987, to the Examiner's attention. A copy of this reference is enclosed along with a Form PTO-1449 listing this reference. <u>Applicant respectfully submits that the claims are patentably distinct over Scitex, since Scitex employs conversion of CAD/CAM data into defined data points which translate into cubic voxels. Scitex as well does not teach or disclose the conversion of CAD/CAM data at intersections with planes corresponding to slicing layers</u>.

(emphasis added). (Siblani 12/18/08 Decl. at ¶ 19. Also see Siblani 12/18/08 Decl. at ¶ 21).

As set forth in Mr. Siblani's December 18, 2008 Declaration at paragraphs 8-21 and 28; Dr. Schillen's Declaration at paragraphs 6-18; and the Declaration of Dr. Magda, the software used for the accused Perfactory and Vanquish machines does not provide data representing adjacent cross-sectional layers of a three-dimensional object to be formed. Instead, the software requires: providing a three-dimensional build volume; subdividing the build volume into volume elements (voxels); determining whether there is an intersection between each voxel and the three-dimensional part to be manufactured; assigning a brightness intensity value to each voxel depending on the intersection amount, if any, which is unique for each voxel and independent of any other voxel; and using the three-dimensional set of brightness intensity values or grayscale values to generate a volumetric model for the part to be manufactured <u>before</u> any manufacturing takes place. Since the 3D volumetric build model could be printed along any arbitrary axis; allows the individual voxels to be modified depending on geometry to reduce the internal stresses caused by material shrinkage; and allows the application of multiple exposures at selected voxel locations to compensate for areas where the energy is not sufficient to generate the necessary solidification, the data information clearly does not represent adjacent, cross-sectional layers nor is the data provided as a layer or a cross-sectional layer.

C.   '981 Patent Claim 11 Limitations 7 and 12 – The Step Of "Exposing" The Polymer To Light

The following analysis also applies to limitations 1, 5, and 10 of the '934 patent; limitations 3 and 12 of the '537 patent; and limitations 2 and 8 of the '143 patent.

Defendants agree that there is no dispute that in both the Perfactory and Vanquish machines the surface of the photopolymer to be cured is subjected to light. Defendants, however, object to the exhibits relied upon by 3D Systems to confirm this, for the reasons in paragraphs 35(f), 38(a)-(b), 38(e), and 38(f) of Mr. Siblani's December 18, 2008 Declaration. Further, the use of a DLP in the accused Perfactory and Vanquish machines is substantially different from a process that applies light by drawing upon a two-dimensional surface. (e.g., Jacobs 7/16/08 Decl. at ¶ 16).

For the reasons stated in the July 29, 2008 Declaration of Dr. Schillen, the July 29, 2008 Declaration of Mr. Siblani, the July 29, 2008 Declaration of Mr. Shkolnik, the July 16, 2008 Declaration of Dr. Jacobs (e.g., ¶¶ 13-17), the December 19, 2008 Declaration of Dr. Jacobs (e.g., ¶¶ 5-8, 15-16, 18-23, and 27-30), the December 18, 2008 Declaration of Dr. Magda, and the December 18, 2008 Declaration of Mr. Siblani, including paragraph 69, the accused Perfactory and Vanquish machines do not infringe claim 11 of the '981 patent.

V.   The '934 Patent, Claim 2

Contrary to the arguments made by 3D Systems on page 14 of its Memorandum, Defendants do not waive their right to contest infringement with respect to other limitations from claim 2 of the '934 patent that are not specifically stated in Defendants' Motion for Summary Judgment of Non-Infringement.

Claim 2 requires a method for "stereolithographically forming a portion of a three-

dimensional object". Neither the Perfactory or Vanquish machines "stereolithographically" form a portion of a three-dimensional object because they do not draw on a two-dimensional surface. The use of a DLP projector to cure a resin is substantially different from applying light by drawing upon a two-dimensional surface.

Claim 2 also requires that a "subsequent layer of the three-dimensional object is formed over a previously formed layer of the object". As set forth previously, the accused Perfactory and Vanquish machines do not form layers of a three-dimensional object. The Vanquish machines include a build platform that moves continuously downward during the build process which avoids the production of layers. The Perfactory machines do not form layers and do not form a subsequent layer of an object "over" a previous layer of the object. Instead, they build parts upside down, on a voxel-by-voxel basis. The photographs of a part produced on the Perfactory and Vanquish machines as compared to the same part produced on 3D's SLA machine (Defendants' Exhibits 6-8 of their Motion for Summary Judgment of Non-Infringement), clearly demonstrate that the Perfactory and Vanquish machines avoid the generation of layer lines, producing a smoother, more polished part.

Claim 2 also requires "forming a uniform coating of desired layer thickness over the previously formed layer". The Perfactory and Vanquish machines do not form a uniform coating of desired layer thickness.

Claim 2 also requires sweeping a winged blade over the previously formed layer. The cooling element of the Vanquish machine is not a winged blade for smoothing resin over the previously formed layer and it does not include "separate members on a lower surface thereof for contacting the building material".

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For the reasons set forth in the July 29, 2008 Declaration of Mr. Shkolnik, the July 29, 2008 Declaration of Mr. Siblani, the July 16, 2008 Declaration of Dr. Jacobs, including paragraphs 30-35, the December 19, 2008 Declaration of Dr. Jacobs, and the December 18, 2008 Declaration of Mr. Siblani, including paragraph 72, the accused Perfactory and Vanquish machines do not infringe claim 2 of the '934 patent.

VI.   The '537 Patent, Claim 81

Contrary to the arguments made by 3D Systems at pages 18-19 of its memorandum, Defendants do not waive their right to contest infringement with respect to claim elements that are not mentioned in their Motion for Summary Judgment of Non-Infringement or their responses to interrogatories.

3D Systems incorrectly states that the Vanquish machine includes an applicator which serves the purposes of smoothing liquid resin above the previously solidified material. At the outset, an applicator is a device for <u>applying</u> material. Claim 81 of the '537 patent requires: an applicator for forming layers of material; the applicator having a bottom opening located near a working surface; a vacuum pump connected to the applicator for <u>drawing up material from the working surface through the bottom opening and into the applicator</u>; and means for sweeping the applicator across at least some portion of the previously formed cross-sections.

In contrast to the applicator disclosed and claimed in the '537 patent, the cooling element used in the Vanquish machine only <u>intermittently moves across the upper surface of the resin</u> in response to the large amount of heat that is generated. The cooling element in the Vanquish machine is also spaced from the resin surface and the compressor that is connected to the cooling element does not draw resin into the cooling element to be later dispensed. The movement of the

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cooling element in the Vanquish machines is intermittent and only occurs when the resin surface

generates a substantial amount of heat. Thus, the cooling element used in the Vanquish machine

does not dispense resin nor does it smooth new resin on the surface. (e.g., Shkolnik 7/29/08

Decl., Siblani 12/18/08 Decl. at ¶¶ 42-43 and 45).

3D Systems relies upon Exhibits 64-73 in alleging equivalence between a belt translation

and lead screw translation. However, these publications refer to non-stereolithography

applications. These documents are irrelevant to the issue as to whether a belt can be used instead

of a screw for purposes of moving the cooling element in the Vanquish machine. In the

Vanquish machine, the belt system was intentionally used to prevent vibration from occurring

since it is not desirable for the cooling element to engage the resin surface when the heat is being

removed by the cooling element whereas a lead screw will impart vibration to the claimed

recoater blade. There is also a gap between the cooling element and the surface of the liquid of

up to 150 microns. When the resin material becomes hot and expands, it will touch the cooling

element so that the heat is conducted by the element away from the resin surface. The belt

system was intentionally used to prevent vibration from occurring since during this expansion

resulting from the heat on the surface, it is not desirable for the cooling element to actually

engage the resin surface when the heat is being removed by the cooling element. Thus, there can

be no equivalence between a belt as used in the Vanquish machine, and a screw as used in the

stereolithographic environment, since the purpose of the claimed lead screw driven applicator

recoater blade is to dispense and smooth resin on the surface whereas the purpose of the belt

driven cooling element used in the Vanquish machine is completely different as previously

described. (e.g., Siblani 12/18/08 Decl. at ¶ 52(l); Shkolnik 7/29/08 Decl.).

Claim 81 additionally requires a vacuum pump for drawing resin into the applicator. The Vanquish machine does not include a vacuum pump or an applicator. As previously stated, the movement of the cooling element in the Vanquish machine is intermittent and only occurs when the resin surface generates a substantial amount of heat. The cooling element used in the Vanquish machine does not dispense resin nor does it smooth new resin on the surface. Further, the compressor is not connected to the cooling element for <u>drawing up material from the working surface through the bottom opening and into the applicator</u>. (e.g., Siblani 12/18/08 Decl. at ¶ 75(e); Shkolnik 7/29/08 Decl.).

For the reasons stated in the July 29, 2008 Declaration of Mr. Shkolnik, the July 29, 2008 Declaration of Mr. Siblani, the December 18, 2008 Declaration of Mr. Siblani, including paragraph 75, the July 16, 2008 Declaration of Dr. Jacobs, including paragraphs 18-25, and the December 19, 2008 Declaration of Dr. Jacobs (e.g., ¶¶ 4-5, 7-8, 13, 16-17, 24, and 29), the accused Perfactory and Vanquish machines do not infringe claim 81 of the '537 patent.

VII.   The '143 Patent, Claim 35

Contrary to the allegations made by 3D Systems at pages 26-27 of its Memorandum, Defendants have not waived their right to claim non-infringement with respect to elements that are not identified in their Motion for Summary Judgment of Non-Infringement or their responses to interrogatories.

Claim 35 of the '143 patent requires a computer programmed to form a support that comprises "a solid which extends along a path connecting" a first object surface and a second surface. The '143 patent (limitation 7). The supports used in the Perfactory and Vanquish are not solid and include both perforations and teeth. (Siblani 7/29/08 Decl. at ¶¶ 23-24; Shkolnik

7/29/08 Decl. at ¶¶ 19-21; Jacobs 7/16/08 Decl. at ¶ 28). 3D Systems is estopped from arguing

that Defendants' perforated and toothed supports are equivalent to the claimed solid supports.

During the prosecution of the '143 patent, 3D argued that the solid support feature of claim 35

(referred to as "webs" in the specification) distinguished the claim from the prior art:

> Using these parts, Applicant first demonstrated **the distortion-reduction benefits of web supports** compared to the other supports. **The part supported by web supports exhibited little or no curl or birdnesting**, while the parts supported by point/leg supports exhibited both curl and birdnesting, and the part supported by mesh supports exhibited curl.
>   * * *
> **Web supports by contrast generally have the strength to reduce curl**, and typically also are easily removable from even fragile surfaces without harming them.
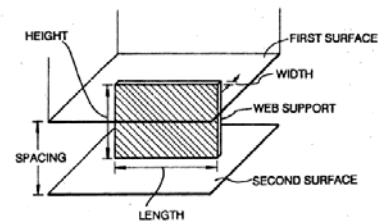
Contrary to the allegations of 3D Systems regarding the Magics Envisiontec software and

forming the support out of the material layer by layer, the software used in the Perfactory and

Vanquish machines sold in the United States will only allow perforated, non-solid, point

supports for purposes of preventing damage to the surface of the part. For the Perfactory and

Vanquish machines sold in the United States, a customer cannot edit or modify the Magics

software to generate other types of supports. (Siblani 12/18/08 Decl. at ¶ 77; Magda Decl. at ¶ 8;

Jacobs 12/19/08 Decl. at ¶¶ 14, 25, and 26).

Claim 35 requires supports which "in cross-sectional width being thin, and comprising a

solid which extends along a path connecting said first and second surfaces, the path having a

vertical path component which is greater than any horizontal path component". Neither the

accused Perfactory or Vanquish machines include a <u>computer</u> programmed to form a support

representation where the supports comprise a solid extending between a first object surface and a

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second surface. The accused Perfactory and Vanquish supports only have a plurality of openings

through them. The supports also narrow into "teeth" at the point of contact with the object. The

accused Perfactory and Vanquish supports differ from solid supports. Solid supports consume

more resin and prolong the length of the build process. The openings in the Perfactory and

Vanquish supports allow uncured resin to flow through the supports during the build process

which reduces the force and stress on the supports and the part. Further, the "teeth" in the

supports reduce the contact surface area making the object easier to remove from the support as

compared to solid supports. (Siblani 12/18/08 Decl. at ¶ 78(b); Siblani 7/29/08 Decl. at ¶¶ 23-

24; Shkolnik Decl. at ¶¶ 19-21; Jacobs 7/16/08 Decl. at ¶ 28).

       Claim 35 also requires "means for receiving… with said object and support

representations". The Court interpreted this limitation to require a computer that includes "the

CAD generator" and which performs the function of "receiving the support representation". The

Court has also interpreted this limitation to require "a beam of UV light or an electric beam or a

spray and mask or impinging radiation other than light". The Court has further construed the

term "object…representations" to mean "data representing adjacent cross-sectional layers of the

three-dimensional object to be formed which was generated on a CAD system". The accused

Perfactory and Vanquish machines do not include a CAD generator or any computer that

generates a CAD model. The accused Perfactory and Vanquish machines do not use any beam

of UV light, an electric beam, a spray and mask, or impinging radiation other than light. The

accused Perfactory and Vanquish machines do not include a computer that provides data

representing adjacent cross-sectional layers of the three-dimensional object. The accused

Perfactory and Vanquish machines do not form a support out of material substantially layer-by-

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layer. (Siblani 12/18/08 Decl. at ¶ 78(c); Jacobs 7/16/08 Decl. at ¶¶ 27-29; Shkolnik Decl. at ¶¶ 19-21).

3D Systems relies upon its Exhibit 29 as allegedly showing a sample infringing support. Exhibit 29 is irrelevant to the issue of infringement because it is an illustration of a support that is not used in the Perfactory or Vanquish machines. The only support available to customers using the Perfactory and Vanquish machines in the United States is the perforated, non-solid support. The support referred to by 3D Systems in its Memorandum is irrelevant since the Perfactory and Vanquish machines do not use it. (Siblani 12/18/08 Decl. at ¶ 35(r). Also see Siblani 12/18/08 Decl. at ¶¶ 35(h), (j), (k), and (l). For the reasons set forth in the December 18, 2008 Declaration of Mr. Siblani, including paragraph 78, the July 29, 2008 Declaration of Mr. Shkolnik including paragraphs 19-21, the July 29, 2008 Declaration of Dr. Schillen at paragraphs 6-17, the July 16, 2008 Declaration of Dr. Jacobs including paragraphs 26-29, the December 19, 2008 Declaration of Dr. Jacobs at paragraphs 14, 25, and 26, and the July 29, 2008 Declaration of Mr. Siblani at paragraphs 23-24, the Perfactory and Vanquish machines do not infringe claim 35 of the '143 patent.

VIII.   Conclusion

For the reasons set forth in this Memorandum and accompanying Declarations as well as

the Defendants' Motion for Summary Judgment of Non-Infringement and accompanying

Declarations and Exhibits, Defendants respectfully submit that they are entitled to summary

judgment of non-infringement as to all four of the paradigm patent claims at issue.

Respectfully submitted,

Dated: December 22, 2008   ENVISIONTEC, INC., ENVISIONTEC GMBH
                                            and SIBCO, INC.

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CERTIFICATE OF SERVICE

I hereby certify that on December 22, 2008, I electronically filed the foregoing paper with the Clerk of the Court using the ECF system which will send notification of such filing to the following: Jonathan A. David, Susan M. Kornfield and Alan N. Harris.

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